

Weather

The term weather refers to the short term changes in the physical characteristics of the troposphere. These physical characteristics include: temperature, air pressure, humidity, precipitation, cloud cover, wind speed and direction. Radiant energy from the sun is the power source for weather. It drives the convective mixing in the troposphere which determines the atmospheric and surface weather conditions.

Certain atmospheric conditions can lead to extreme weather phenomena such as thunderstorms, floods, tornadoes and hurricanes. A thunderstorm forms in a region of atmospheric instability, often occurring at the boundary between cold and warm fronts. Warm, moist air rises rapidly (updraft) while cooler air flows down to the surface (downdraft). Thunderstorms produce intense rainfall, lightening and thunder. If the atmospheric instability is very large and there is a large increase in wind strength with altitude (vertical wind shear), the thunderstorm may become severe. A severe thunderstorm can produce flash floods, hail, violent surface winds and tornadoes.



Floods can occur when atmospheric conditions allow a storm to remain in a given area for a length of time, or when a severe thunderstorm dumps very large amounts of rainfall in a short time period. When the ground becomes saturated with water, the excess runoff flows into low-lying areas or rivers and causes flooding.

A tornado begins in a severe thunderstorm. Vertical wind shear causes the updraft in the storm to rotate and form a funnel. The rotational wind speeds increase and vertical stretching occurs due to angular momentum. As air is drawn into the funnel core, it cools rapidly and condenses to form a visible funnel cloud. The funnel cloud descends to the surface as more air is drawn in. Wind speeds in tornadoes can reach several hundred miles per hour. Tornadoes are most prevalent in the Great Plains region of the United States, forming when cold dry polar air from Canada collides with warm moist tropical air from the Gulf of Mexico.



A cyclone is an area of low pressure with winds blowing counter-clockwise (Northern Hemisphere) or clockwise (Southern Hemisphere) around it. Tropical cyclones are given different names depending on their wind speed. The strongest tropical cyclones in the Atlantic Ocean (wind speed exceeds 74 miles per hour) are called hurricanes. These storms are called typhoons (Pacific Ocean) or cyclones (Indian Ocean) in other parts of

the world. Hurricanes are the most powerful of all weather systems, characterized by strong winds and heavy rain over wide areas. They form over the warm tropical ocean and quickly lose intensity when they move over land. Hurricanes affecting the continental United States generally occur from June through November.

